Passive fire protection protect the structure from concrete spalling and heating up the concrete and reinforcement. Allow a fast repair after a fire. Has an aesthetic function as well.

TUNNEL LINING AND FIRE PROTECTION INSIDE SÖDERTUNNELN
THE PROJECT:

The Söderledstunneln (“South Way Tunnel”) is a tunnel between the Central Bridge and the Johanneshov Bridge on the island of Södermalm in Stockholm. Approximately 1,580 metres long and traverses the island from north to south.

On the stretch between Brännkyrkagatan and Folkungagatan an earlier tunnel called Södergatan had been built in 1944 in a cut-and-cover trench. Between 1964–1966, it was extended 150 metres under Åso High School. The tunnel as it is today was started in 1984. The work finished on schedule in January 2003 with the Clarion Hotel in the South End.

The total refurbishment of the western bound tunnel was closed between the 4th of July until 28th of November 2011. The upgrade of the fire protection was a main part of the refurbishment. Also concrete works, barrier elements, asphalt works, M&E installation and wall painting brought a lot of activities in the tunnel. So more than 100 workers were in the tunnel at the same time.

FACTS:

- 1580 m tunnel + 3 ramps
- 21,000 sqm of ceiling
- 17 different cross sections and construction types
- 25 special details: mushroom pillars, boxes, joints, beams
- 23,000 sqm of fire protection boards
- 150,000 anchors and screws
- 8,000 m stainless steel profiles
- 12 lifts
- 25 workers
- 18 production weeks
The refurbishment is based on a fire protection concept which differs for each cross section. Due to the different construction types and times the concrete cover and the structural loads and different risk zones influence the fire protection criteria.

The original fire protection design was made on a fire protection with a sprayable concrete material in thickness from 25 to 60 mm.

In the project preparation TBT worked together with the head contractor and the manufacture on an alternative solution with fire protection boards. The advantages are:

- 20 mm thickness of boards for all areas
- less working time in the tunnel
- more flexibility with other works
- light grey smooth surface

During the project, TBT and the head contractor convinced the client to protect the whole tunnel ceiling with fire protection to reduce the risk of a tunnel closure. The areas without buildings on top got an lower risk for fire protection, but a concrete repair in such an area after an fire would taken much time on a high priority road. As well the look of the tunnel ceiling is always similar. The detailed execution design was developed together under the supervision by TBT.
Installation of sub-frame under pre-stressed TT-cassettes

Fire and noise protection in the ramp

Installation of fire protection boards

Installation of the fire protection boards under the pre-stressed TT-cassettes
Brackets for the subframe

Starting the installation from the middle

Narrow conditions for installation in the tunnel, driving lane of 3m must be open all the time

Installation of fire sprotection boards on the sub-frame under existing noise reduction
Working on the scissor lifts

Frames for the noise reduction under the fire protection

Working on the scissor lifts

Final view at the south intersection
Final view at the middle ramp with side wall cladding and fire protection box for ventilation ducts from the building on top.

Detail mushroom pillar protected with boards.

2 days before opening.
TBT SERVICES

- conceptional design and installation for passive fire protection systems according to different fire curves and times.
- installation of passive fire protection systems and linings based on a wide range of different materials – fire protection boards, sprayable materials, architectural boards, fixings, fire protection accessories, coatings, textiles, membranes and subframes
- conceptional design and installation for architectural linings for road tunnel and railway stations
- installation concepts
- installation concepts, i.e. under traffic, coordination with other works
- planning and installation of escape way signs and lights
- fire extinguishers and services
- fire stops and joint protection
- consulting
- coordination
- project management

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